New England Common Assessment Program

**Released Items
2006**

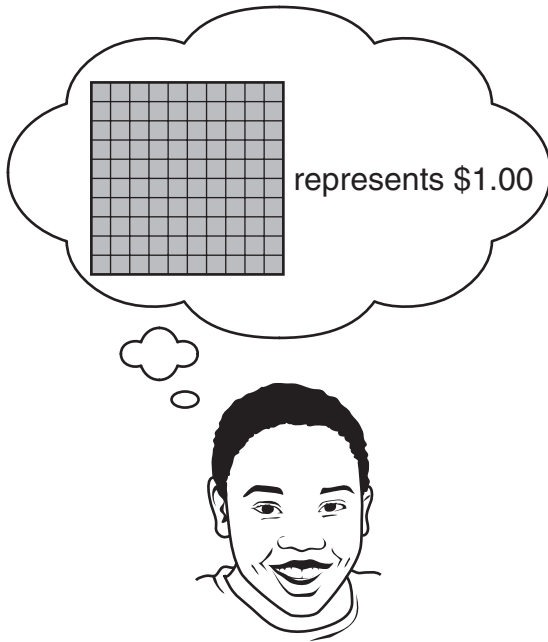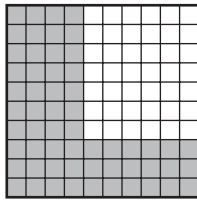**Grade 5
Mathematics**

Mathematics

1 This grid is shaded gray to represent the cost of a muffin.

represents $1.00

What is the cost of the muffin?

A. $0.43
B. $0.46
C. $0.58
D. $0.70

2 Look at the students' work on the blackboard.

Alvin	Blake
2 ten thousands + 4 hundreds	24 thousands
Carlos	Dimitra
24 hundreds	2 ten thousands + 4 thousands

Which two students named the same number?

A. Alvin and Blake
B. Alvin and Carlos
C. Blake and Carlos
D. Blake and Dimitra

3 You may use the number line below to answer this question.
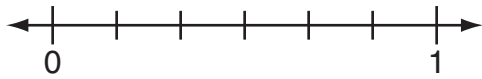
Which fractions are in order from least to greatest?

A. $\frac{1}{2}$, $\frac{2}{3}$, $\frac{2}{6}$

B. $\frac{1}{2}$, $\frac{2}{6}$, $\frac{2}{3}$

C. $\frac{2}{6}$, $\frac{2}{3}$, $\frac{1}{2}$

D. $\frac{2}{6}$, $\frac{1}{2}$, $\frac{2}{3}$

4 A festival is taking place on Mr. Wilson's field. The picture below shows how the field is divided into ten equal sections.
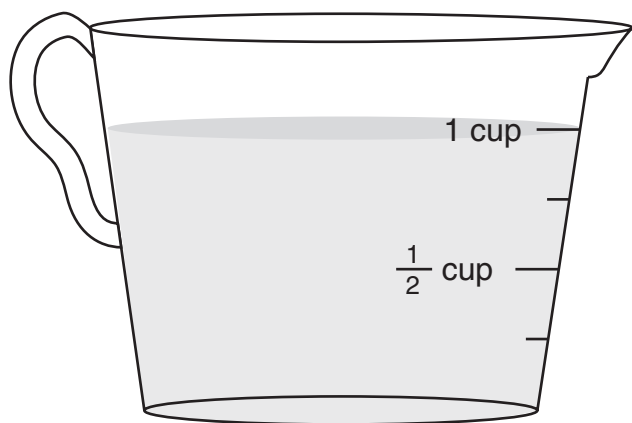
Mr. Wilson's Field

Food	Parking
Games	Parking
Food	Games
Parking	Food
Parking	Games

What fraction of the field is used for parking?

A. $\frac{3}{10}$

B. $\frac{1}{3}$

C. $\frac{2}{5}$

D. $\frac{4}{6}$

5 Mr. Diaz has 1 cup of gravy in a measuring cup.

1 cup

$\frac{1}{2}$ cup

He pours out $\frac{1}{4}$ cup of gravy. How much gravy is left in the measuring cup?

A. $\frac{1}{4}$ cup

B. $\frac{1}{2}$ cup

C. $\frac{2}{3}$ cup

D. $\frac{3}{4}$ cup

6 Quinn used a total of 56 apples to make pies. Each pie was made with the same number of apples. How many pies could Quinn have made?

A. 3

B. 7

C. 9

D. 11

3

7 Mrs. Lombardi had 2 hours to prepare for a party. The chart below shows the amount of time she spent completing different tasks.

Time Mrs. Lombardi Spent on Different Tasks

Task	Time
Decorated cake	20 minutes
Made punch	15 minutes
Made sandwiches	50 minutes
Put up balloons	?

How much time did Mrs. Lombardi have to put up the balloons?
[1 hour = 60 minutes]

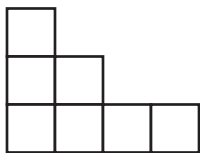A. 15 minutes

B. 25 minutes

C. 35 minutes

D. 45 minutes

8 Beverly uses $\frac{1}{4}$ cup of applesauce in place of every $\frac{1}{3}$ cup of butter in her cookie recipe. How many cups of applesauce will Beverly use in place of 1 cup of butter?

A. $\frac{1}{12}$
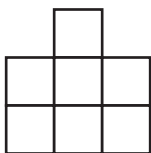
B. $\frac{1}{7}$

C. $\frac{2}{4}$

D. $\frac{3}{4}$

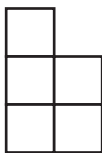**9** Leah made this figure using grid paper.

Without any gaps or overlaps, which figure fits together with Leah's figure to form a rectangle congruent to the rectangle below?
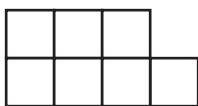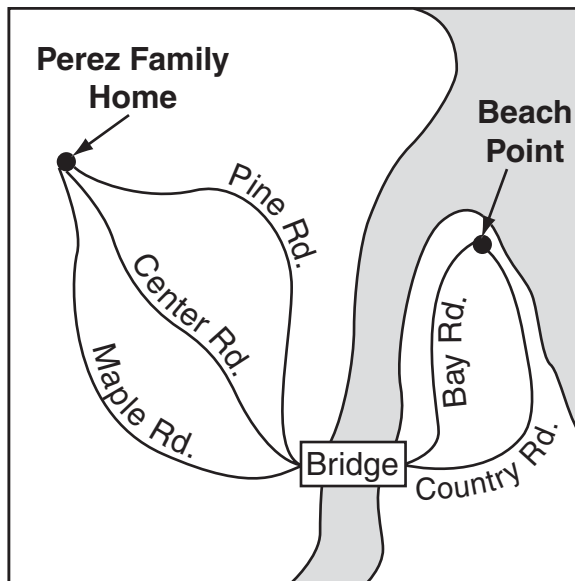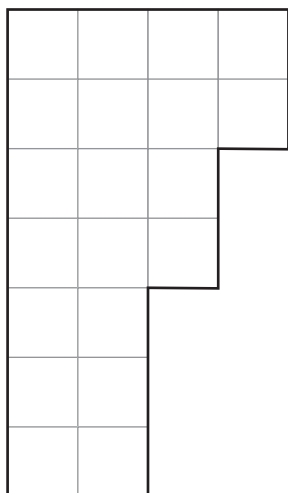
A.

B.

C.

D.

10 The diagram below shows all the roads the Perez family can take from their home to Beach Point.

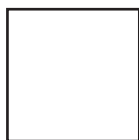How many different ways can the Perez family drive from their home to Beach Point?

A. 2

B. 3

C. 5

D. 6

⑪ Using grid paper, Fletcher made this model of the shape of Vermont.

He learned that $\frac{3}{4}$ of Vermont is forest. How many ☐ should Fletcher shade gray to represent the fraction of Vermont that is forest?

⑫ Karen used toothpicks to make the two shapes shown below.
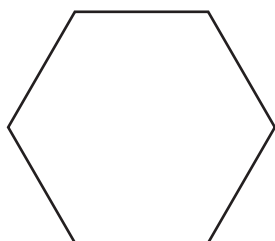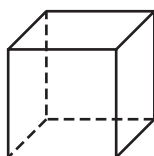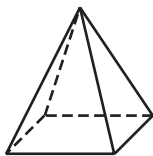
Square   **Hexagon**

She used a total of 24 toothpicks to make the square. She made the hexagon so that its sides are the same length as the sides of the square. How many toothpicks did Karen use to make the hexagon?

❸ Jack and Diane each picked a mystery solid from the ones shown below.

M   N   O

P   Q

a. Here are the clues to Jack's mystery solid.

    Clue 1: The mystery solid is a prism.

    Clue 2: The mystery solid has 5 faces.

  Which solid is Jack's mystery solid?

b. Here are the clues to Diane's mystery solid.

    Clue 1: The mystery solid is a prism.

    Clue 2: All of its faces are the same shape.

  Which solid is Diane's mystery solid?

14 Students sold a total of 130 bags of popcorn during a popcorn sale. Marge is making this pictograph to show the number of bags of popcorn sold on each day of the sale. The sales for Friday are missing.
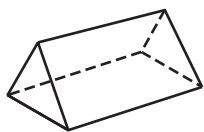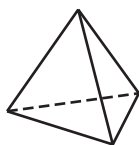
Popcorn Sales

Monday	🍿🍿🍿🍿
Tuesday	🍿🍿🍿🍿🍿🍿
Wednesday	🍿🍿🍿🍿🍿
Thursday	🍿🍿🍿🍿🍿
Friday	

Key
🍿 represents 5 bags of popcorn

How many 🍿 does Marge need to add to the pictograph to show Friday's sales? Show your work or explain how you know.

⑮ In these number sentences, each star represents the same number and the heart represents a different number.

$$\star + \star + \star = 12$$

$$\heartsuit - 2 = \star$$

a. What number does the star represent? Show your work or explain how you know.

b. What is the value of one star plus two hearts? Show your work or explain how you know.

Grade 5 Mathematics Released Item Information

Released Item Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No Tools Allowed						✓	✓	✓	✓	✓			✓		
Content Strand[1]	NO	NO	NO	NO	NO	NO	NO	NO	GM	DP	NO	GM	GM	DP	FA
GLE Code	4-1	4-1	4-2	4-2	4-3	4-4	4-4	4-4	4-4	4-4	4-1	4-6	4-3	4-1	4-4
Depth of Knowledge Code	1	1	2	2	2	1	2	3	2	2	2	2	2	3	2
Item Type[2]	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	SA	SA	SA	SA	CR
Answer Key	C	D	D	C	D	B	C	D	B	D					
Total Possible Points	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4

[1]Content Strand: NO = Numbers & Operations, GM = Geometry & Measurement, FA = Functions & Algebra,
DP = Data, Statistics, & Probability

[2]Item Type: MC = Multiple Choice, SA = Short Answer, CR = Constructed Response

NEW ENGLAND
COMMON ASSESSMENT PROGRAM

Released Items
Support Materials
2006

Grade 5
Mathematics

N&O 4.1 **Demonstrates conceptual understanding of rational numbers with respect to: whole numbers** <u>from 0 to 999,999</u> through equivalency, composition, decomposition, or place value **using models, explanations, or other representations**; and **positive fractional numbers** (benchmark fractions: *a*/2, *a*/3, *a*/4, <u>*a*/5</u>, *a*/6, *a*/8, or <u>*a*/10</u>, where *a* is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area, set, or <u>linear models</u> where the number of parts in the whole are equal to, and a <u>multiple or factor of the denominator</u>; and **decimals** <u>as hundredths</u> within the context of money, or tenths <u>within the context of metric measurements (e.g., 2.3 cm)</u> **using models, explanations, or other representations**.

---

1 This grid is shaded gray to represent the cost of a muffin.

What is the cost of the muffin?

A. $0.43

B. $0.46

C. $0.58

D. $0.70

N&O 4.1 **Demonstrates conceptual understanding of rational numbers with respect to: whole numbers** <u>from 0 to 999,999</u> through equivalency, composition, decomposition, or place value **using models, explanations, or other representations**; and **positive fractional numbers** (benchmark fractions: *a/*2, *a/*3, *a/*4, <u>*a/*5</u>, *a/*6, *a/*8, or <u>*a/*10</u>, where *a* is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area, set, or <u>linear models</u> where the number of parts in the whole are equal to, and a <u>multiple or factor of the denominator;</u> and **decimals** <u>as hundredths</u> within the context of money, or tenths<u> within the context of metric measurements (e.g., 2.3 cm)</u> **using models, explanations, or other representations**.

---

2 Look at the students' work on the blackboard.

Alvin	Blake
2 ten thousands + 4 hundreds	24 thousands
Carlos	Dimitra
24 hundreds	2 ten thousands + 4 thousands

Which two students named the same number?

A. Alvin and Blake

B. Alvin and Carlos

C. Blake and Carlos

D. Blake and Dimitra

N&O 4.2 **Demonstrates understanding of the relative magnitude of numbers** from <u>0 to 999,999</u> by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive <u>fractional numbers</u>; <u>or decimals</u> using models, number lines, or explanations.

---

3 You may use the number line below to answer this question.
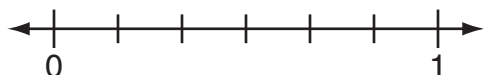
Which fractions are in order from least to greatest?

A. $\frac{1}{2}, \frac{2}{3}, \frac{2}{6}$

B. $\frac{1}{2}, \frac{2}{6}, \frac{2}{3}$

C. $\frac{2}{6}, \frac{2}{3}, \frac{1}{2}$

D. $\frac{2}{6}, \frac{1}{2}, \frac{2}{3}$

N&O 4.2 **Demonstrates understanding of the relative magnitude of numbers** from <u>0 to 999,999</u> by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive <u>fractional numbers;</u> <u>or decimals</u> using models, number lines, or explanations.

---

4 A festival is taking place on Mr. Wilson's field. The picture below shows how the field is divided into ten equal sections.

Mr. Wilson's Field

Food	Parking
Games	Parking
Food	Games
Parking	Food
Parking	Games

What fraction of the field is used for parking?

A. $\frac{3}{10}$

B. $\frac{1}{3}$

C. $\frac{2}{5}$

D. $\frac{4}{6}$

N&O 4.3 **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the relationship between repeated subtraction and division (no remainders); the inverse relationship between multiplication and division of whole numbers; or the addition or subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.

5 Mr. Diaz has 1 cup of gravy in a measuring cup.

He pours out $\frac{1}{4}$ cup of gravy. How much gravy is left in the measuring cup?

A. $\frac{1}{4}$ cup

B. $\frac{1}{2}$ cup

C. $\frac{2}{3}$ cup

D. $\frac{3}{4}$ cup

N&O 4.4 **Accurately solves problems involving** <u>multiple operations on whole numbers or the use of the properties of factors and multiples</u>; and addition or subtraction of <u>decimals and positive proper fractions with like denominators</u>. (<u>Multiplication limited to 2 digits by 2 digits, and division limited to 1 digit divisors</u>.)

(IMPORTANT: *Applies the conventions of order of operations where the left to right computations are modified only by the use of parentheses*.)

6 Quinn used a total of 56 apples to make pies. Each pie was made with the same number of apples. How many pies could Quinn have made?

A. 3

B. 7

C. 9

D. 11

N&O 4.4 **Accurately solves problems involving** <u>multiple operations on whole numbers or the use of the properties</u> <u>of factors and multiples</u>; and addition or subtraction of <u>decimals and positive proper fractions with like</u> <u>denominators</u>. (<u>Multiplication limited to 2 digits by 2 digits, and division limited to 1 digit divisors</u>.)

(IMPORTANT*: Applies the conventions of order of operations where the left to right computations are modified only by the use of parentheses*.)

---

7 Mrs. Lombardi had 2 hours to prepare for a party. The chart below shows the amount of time she spent completing different tasks.

Time Mrs. Lombardi Spent on Different Tasks

Task	Time
Decorated cake	20 minutes
Made punch	15 minutes
Made sandwiches	50 minutes
Put up balloons	?

How much time did Mrs. Lombardi have to put up the balloons?
[1 hour = 60 minutes]

A. 15 minutes

B. 25 minutes

C. 35 minutes

D. 45 minutes

> **N&O 4.4** **Accurately solves problems involving** <u>multiple operations on whole numbers or the use of the properties of factors and multiples</u>; and addition or subtraction of <u>decimals and positive proper fractions with like denominators</u>. (<u>Multiplication limited to 2 digits by 2 digits, and division limited to 1 digit divisors.</u>)
>
> (IMPORTANT: *Applies the conventions of order of operations where the left to right computations are modified only by the use of parentheses.*)

8 Beverly uses $\frac{1}{4}$ cup of applesauce in place of every $\frac{1}{3}$ cup of butter in her cookie recipe. How many cups of applesauce will Beverly use in place of 1 cup of butter?

A. $\frac{1}{12}$

B. $\frac{1}{7}$

C. $\frac{2}{4}$

D. $\frac{3}{4}$

G&M 4.4 **Demonstrates conceptual understanding of congruency** by matching congruent figures using reflections, translations, or rotations (flips, slides, or turns), or as the result of composing or decomposing shapes using models or explanations.

9 Leah made this figure using grid paper.
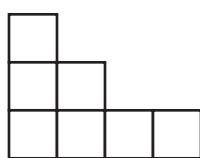
Without any gaps or overlaps, which figure fits together with Leah's figure to form a rectangle congruent to the rectangle below?

A.

B.

C.

D.
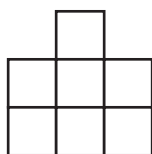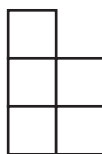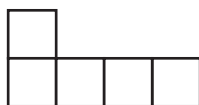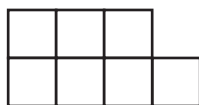
DSP 4.4   **Uses counting techniques to solve problems** in context involving combinations or <u>simple permutations</u> (e.g., Given a map – Determine the number of paths from point A to point B.) using a variety of strategies (e.g., organized lists, tables, tree diagrams, or[sc] others).

10 The diagram below shows all the roads the Perez family can take from their home to Beach Point.

How many different ways can the Perez family drive from their home to Beach Point?

A. 2

B. 3

C. 5

D. 6

N&O 4.1 **Demonstrates conceptual understanding of rational numbers with respect to: whole numbers** <u>from 0 to 999,999</u> through equivalency, composition, decomposition, or place value **using models, explanations, or other representations**; and **positive fractional numbers** (benchmark fractions: $a/2$, $a/3$, $a/4$, <u>$a/5$</u>, $a/6$, $a/8$, or <u>$a/10$</u>, where a is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area, set, or <u>linear models</u> where the number of parts in the whole are equal to, and a <u>multiple or factor of the denominator;</u> and **decimals** <u>as hundredths</u> within the context of money, or tenths <u>within the context of metric measurements (e.g., 2.3 cm)</u> **using models, explanations, or other representations**.

⓫ Using grid paper, Fletcher made this model of the shape of Vermont.

He learned that $\frac{3}{4}$ of Vermont is forest. How many ☐ should Fletcher shade gray to represent the fraction of Vermont that is forest?

Scoring Guide

Score	Description
1	Student gives correct number of squares to be shaded, **15**.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

SCORE POINT 1
(EXAMPLE A)

I think that Fletcher should shade in 15 boxes gray to represent the fraction of vermont that is forest.

Student's answer is correct.

SCORE POINT 0
(EXAMPLE A)

Fletcher should shade three square because $\frac{3}{4}$ means 3 out of 4.

Student's answer is incorrect.

G&M 4.6 **Demonstrates conceptual understanding of perimeter of** polygons, and **the area of** rectangles, <u>polygons or irregular shapes on grids</u> using a variety of models, manipulatives, or <u>formulas</u>. Expresses all measures using appropriate units.

---

⑫ Karen used toothpicks to make the two shapes shown below.
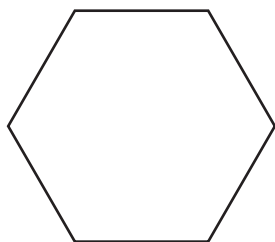
Square　　　　**Hexagon**

She used a total of 24 toothpicks to make the square. She made the hexagon so that its sides are the same length as the sides of the square. How many toothpicks did Karen use to make the hexagon?

Scoring Guide

Score	Description
1	Student gives the correct number of toothpicks, **36**.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

SCORE POINT 1
(EXAMPLE A)
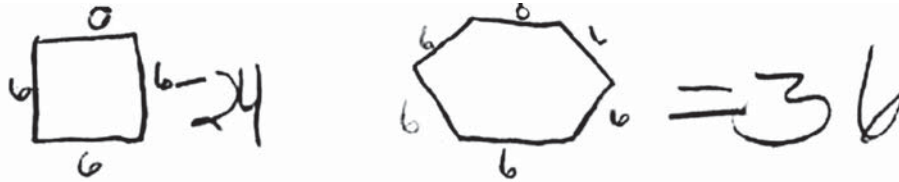
Student's answer is correct
(work is not required).

SCORE POINT 1
(EXAMPLE B)

Karen used 6 tooth picks per side there were
6 sides   6 x 6 = 36   36 tooth picks

Student's answer is correct
(work is not required).

SCORE POINT 0
(EXAMPLE A)

Student's answer is incorrect.

G&M 4.3 **Uses properties or attributes** (shape of bases or number of lateral faces) **to identify, compare, or describe three-dimensional shapes** (rectangular prisms, triangular prisms, cylinders, or spheres).

---

13 Jack and Diane each picked a mystery solid from the ones shown below.

M   N   O

P   Q

a. Here are the clues to Jack's mystery solid.

  Clue 1: The mystery solid is a prism.

  Clue 2: The mystery solid has 5 faces.

 Which solid is Jack's mystery solid?

b. Here are the clues to Diane's mystery solid.

  Clue 1: The mystery solid is a prism.

  Clue 2: All of its faces are the same shape.

 Which solid is Diane's mystery solid?

Scoring Guide

Score	Description
2	Student answers both parts correctly.
1	Student answers one part correctly.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Sample Responses:

Part a: Solid P (or triangular prism)

Part b: Solid M (or cube) OR Solid O (or rectangular prism)

SCORE POINT 2
(EXAMPLE A)

a. triangular prisiar

b. rectangular prisim

a) Student's answer is correct. (1 point)

b) Student's answer is correct. (1 point)

SCORE POINT 2
(EXAMPLE B)

Ⓐ Jacks mystery solid is letter P.

Ⓑ Danies mystery solid is letter o.

a) Student's answer is correct. (1 point)

b) Student's answer is correct. (1 point)

SCORE POINT 1
(EXAMPLE A)

Jack's mystery solid: P - triangular prism

Diane's mystery solid: Q - triangular pyramid

a) Student's answer is correct. (1 point)

b) Student's answer is incorrect. (0 points)

SCORE POINT 1
(EXAMPLE B)

Jack:

Diane:

N

M

a) Student's answer is incorrect. (0 points)

b) Student's answer is correct. (1 point)

Score Point 0
(Example A)

Diane's mystery solid is Q
Jack's mystery solid is M.

a) Student's answer is incorrect. (0 points)
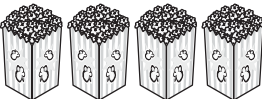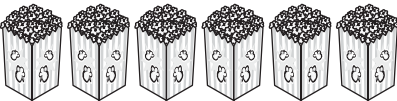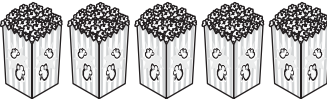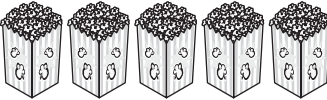
b) Student's answer is incorrect. (0 points)

DSP 4.1 **Interprets a given representation** (line plots, tables, bar graphs, <u>pictographs</u>, or <u>circle graphs</u>) to answer questions related to the data, to analyze the data to formulate or <u>justify</u> conclusions, to make predictions, or to <u>solve problems</u>.

(IMPORTANT: *Analyzes data consistent with concepts and skills in M(DSP)–4–2.*)

---

14 Students sold a total of 130 bags of popcorn during a popcorn sale. Marge is making this pictograph to show the number of bags of popcorn sold on each day of the sale. The sales for Friday are missing.

Popcorn Sales

Monday	🍿🍿🍿🍿
Tuesday	🍿🍿🍿🍿🍿🍿
Wednesday	🍿🍿🍿🍿
Thursday	🍿🍿🍿🍿🍿
Friday	

Key

🍿 represents 5 bags of popcorn

How many 🍿 does Marge need to add to the pictograph to show Friday's sales? Show your work or explain how you know.

Scoring Guide

Score	Description
2	Student gives correct answer, **6**, with work shown or explanation given.
1	Student gives correct answer but no work or explanation. OR Student's work or explanation shows correct strategy in solving the problem, but there is a computation error. OR Student finds 30 bags on Friday, with work shown or explanation given.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Sample Responses:

4 + 6 + 5 + 5 = 20, 20 × 5 = 100, 130 − 100 = 30 bags sold on Friday. Therefore we need 30 ÷ 5 = 6 pictures to complete the pictograph.

OR

We need 130 ÷ 5 = 26 pictures in all. There are 4 + 6 + 5 + 5 = 20 pictures already. Therefore we need 26 − 20 = 6 more pictures.

SCORE POINT 2
(EXAMPLE A)

all bags on graph = 100   (6) x 5 = 30

                                100
                              + 30   6 more
                                130   bags

Student's answer is correct,
with work shown. (2 points)

SCORE POINT 1
(EXAMPLE A)

6 I counted the bags and
multiplied

Student's answer is correct,
with insufficient explanation
given. (1 point)

SCORE POINT 1
(EXAMPLE B)

$$\begin{array}{r} ^{1}20 \\ +30 \\ +25 \\ 25 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 130 \\ -100 \\ \hline 030 \end{array}$$

$$\begin{array}{r} 130 \\ 100 \end{array}$$

^{30}bags of Popcorn

Student's answer is incorrect but with a sufficient intermediate step (finds 30 bags, with work shown). (1 point)

SCORE POINT 0
(EXAMPLE A)

$$
\begin{array}{r}
1\overset{7}{\cancel{8}}\overset{}{0} \\
-\ \ 5 \\
\hline
125
\end{array}
$$

5 bags

(Guess, be conse not
sure How to Figur out)

Student's answer is incorrect and does not show a correct strategy. (0 points)

F&A 4.4 **Demonstrates conceptual understanding of equality** by showing equivalence between two expressions using models or different representations of the expressions, by simplifying numerical expressions where left to right computations may be modified only by the use of parentheses [e.g., $14 - (2 \times 5)$] (expressions consistent with the parameters of M(F&A)–4–3), and by solving one-step linear equations of the form $ax = c$, $x \pm b = c$, where a, b, and c are whole numbers with $a \neq 0$.

---

15 In these number sentences, each star represents the same number and the heart represents a different number.

$$\star + \star + \star = 12$$

$$\heartsuit - 2 = \star$$

a. What number does the star represent? Show your work or explain how you know.

b. What is the value of one star plus two hearts? Show your work or explain how you know.

Scoring Guide

Score	Description
4	4 points
3	3 points
2	2 points
1	1 point
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Training Notes:

Part a: 2 points   for the correct answer, **4**, with work shown or explanation given

OR

1 point   for the correct answer with incomplete or no work shown or explanation given

or

for correct strategy shown in solving the problem but there is a computational error

Part b: 2 points   for the correct answer, **16**, or a correct answer based on an incorrect answer in part a, with work shown or explanation given

OR

1 point   for the correct answer with incomplete or no work shown or explanation given

or

for some correct strategy shown

Sample Responses:

Part a: 12 ÷ 3 = 4

OR

4 + 4 + 4 = 12

Part b: ♡ − 2 = 4 → ♡ = 6, 6 + 6 + 4 = 16

SCORE POINT 4
(EXAMPLE A)

A. ④. 4+4+4=12. 4×3=12.

a) Student's answer is correct,
with work shown. (2 points)

B.⑯. IF 1 star=4, than the answer is
4. Now the problem looks like this.
?-2=4. b-2=4. So if the heart=b,
then 4+b·b=⑯.

b) Student's answer is correct,
with explanation given. (2 points)

SCORE POINT 3
(EXAMPLE A)

$\star = 4$ Because $4 + 4 + 4 = 12$

$\heartsuit = 6$ Because $6 - 2 = 4$

a) Student's answer is correct, with work shown. (2 points)

b) Student completes an intermediate step (finds the value of one heart) but does not answer the question. (1 point)

30

SCORE POINT 3
(EXAMPLE B)

A. $4 + 4 + 4 = 12$

B. $4 + \heartsuit + \heartsuit = 18$

a) Student's answer is correct, with work shown. (2 points)

b) Student's answer is incorrect (computation error) but shows a correct strategy. (1 point)

SCORE POINT 2
(EXAMPLE A)

a 4

> a) Student's answer is correct, with no work shown or explanation given. (1 point)

b 16

> b) Student's answer is correct, with no work shown or explanation given. (1 point)

SCORE POINT 2
(EXAMPLE B)

A. $12 \div 3 = 4$ (stars)

> a) Student's answer is correct, with work shown. (2 points)

B $3 + 2 = 5$ (hearts)

> b) Student's answer is incorrect and does not show a correct strategy. (0 points)

SCORE POINT 1
(EXAMPLE A)

a) ☆ = 4

a) Student's answer is correct, with no work shown or explanation given. (1 point)

b) ☆☆☆ + ♡♡ = 20

b) Student's answer is incorrect and does not show a correct strategy. (0 points)

SCORE POINT 0
(EXAMPLE A)

the STAr represents $2 \cdot 4 + 6 = 12$ becaus $2 + 4 + 6 = 12$

$2 + 4 + 6 = 12$

a) Student's answer is incorrect and does not show a correct strategy. (0 points)

the Value of 2 heartes + 1 star $= 12$

$\begin{array}{r} -16 \\ \hline 12 \end{array}$

b) Student's answer is incorrect and does not show a correct strategy. (0 points)